West Coast Industrial Plan

Project-based infrastructure demand analysis

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THE GREEN HOUSE

STRATEGIES FOR CHANGE

Presentation Overview

- Overview of large industrial projects
- Methodology
- Total anticipated capex, jobs and timing
- Service demand impacts & synergies
- Total estimated infrastructure requirement costs
- Demonstrate model functionality
- Direct jobs and skills analysis
- Estimate of induced demand for social facilities
- Additional synergies
- Closing the loop: suggested assessment framework

Overview of Industrial projects considered

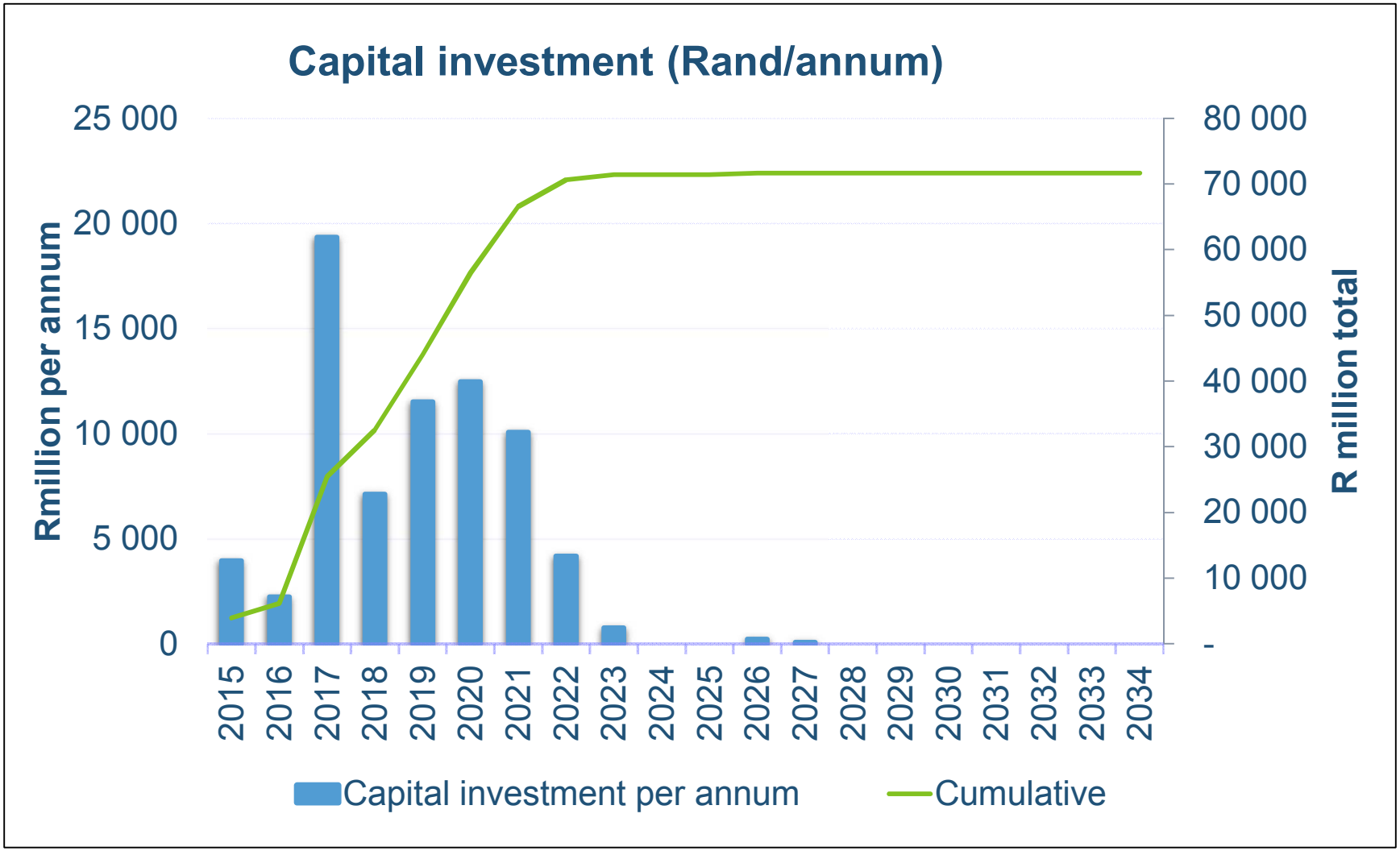
- Not possible to directly interview all projects.
  - Information sourced from a mixture of interviews, EIAs, info supplied through an intermediary

Sector	Number	Probability
Mining, quarrying & manufacturing	9, (7 involve processing of some kind)	High, but delayed starts due to lack of market finance
Mineral storage	5	Market driven, unknown
TNPA projects	5	Delays due to market finance
Oil & gas sector storage and/or distribution	3	At least 2 probable
Oil and gas sector servicing	2	Dependent on other market developments
Gas power plants	6	Max 2 expected to proceed
Fishing industry	1	High

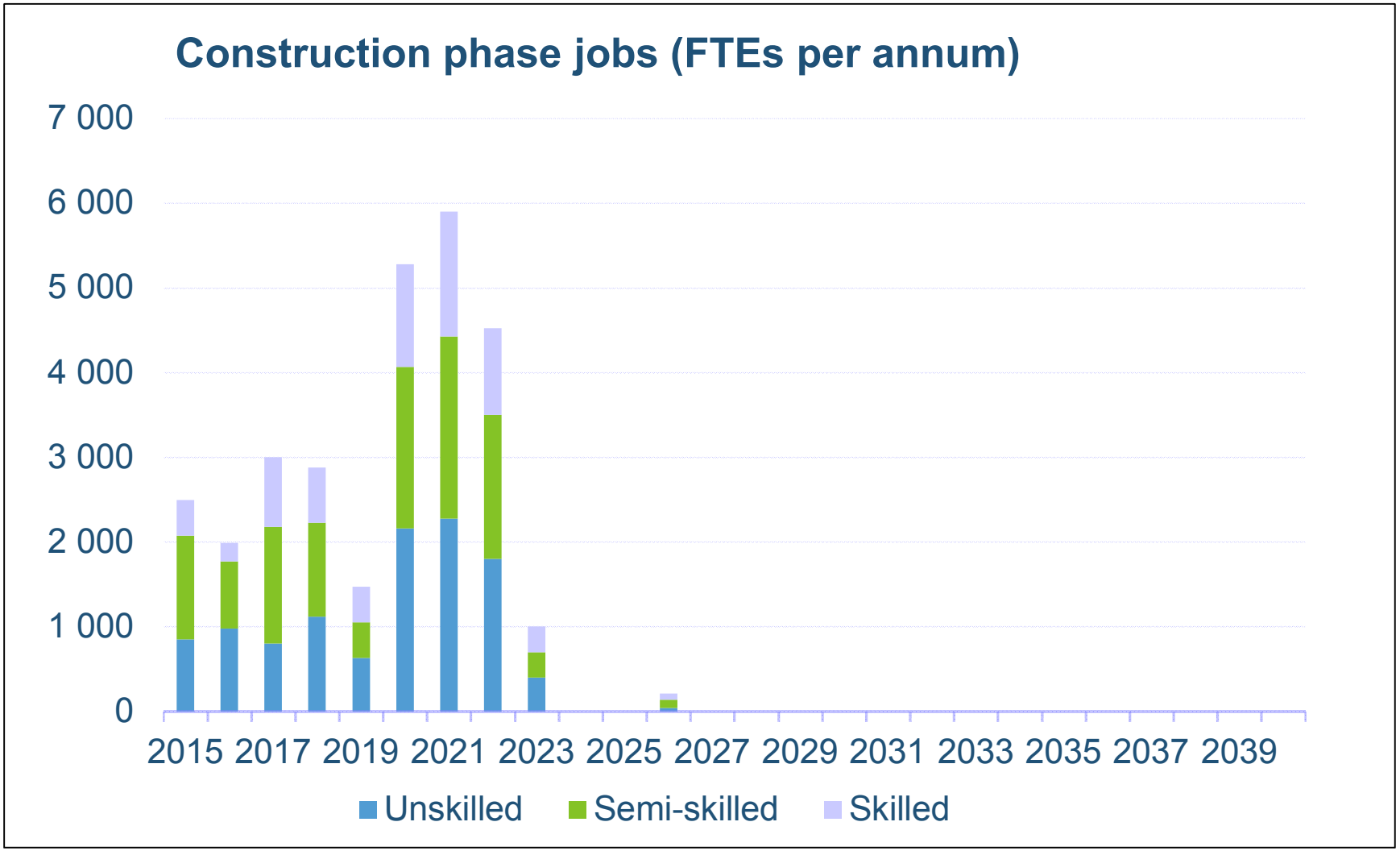
Methodology, key assumptions & data limitations

- Analysis focused on technical service demands, not economic impact
  - No turnover figures provided, IPP concerns, market conditions
- Developed simple Excel model to assess impact of project timing and probability in total demand for services.
  - Assumed no growth in demand for existing industrial base
  - Did include estimated induced demand from in-migration
- Separate analysis of in-migration estimates, and related demand for social services

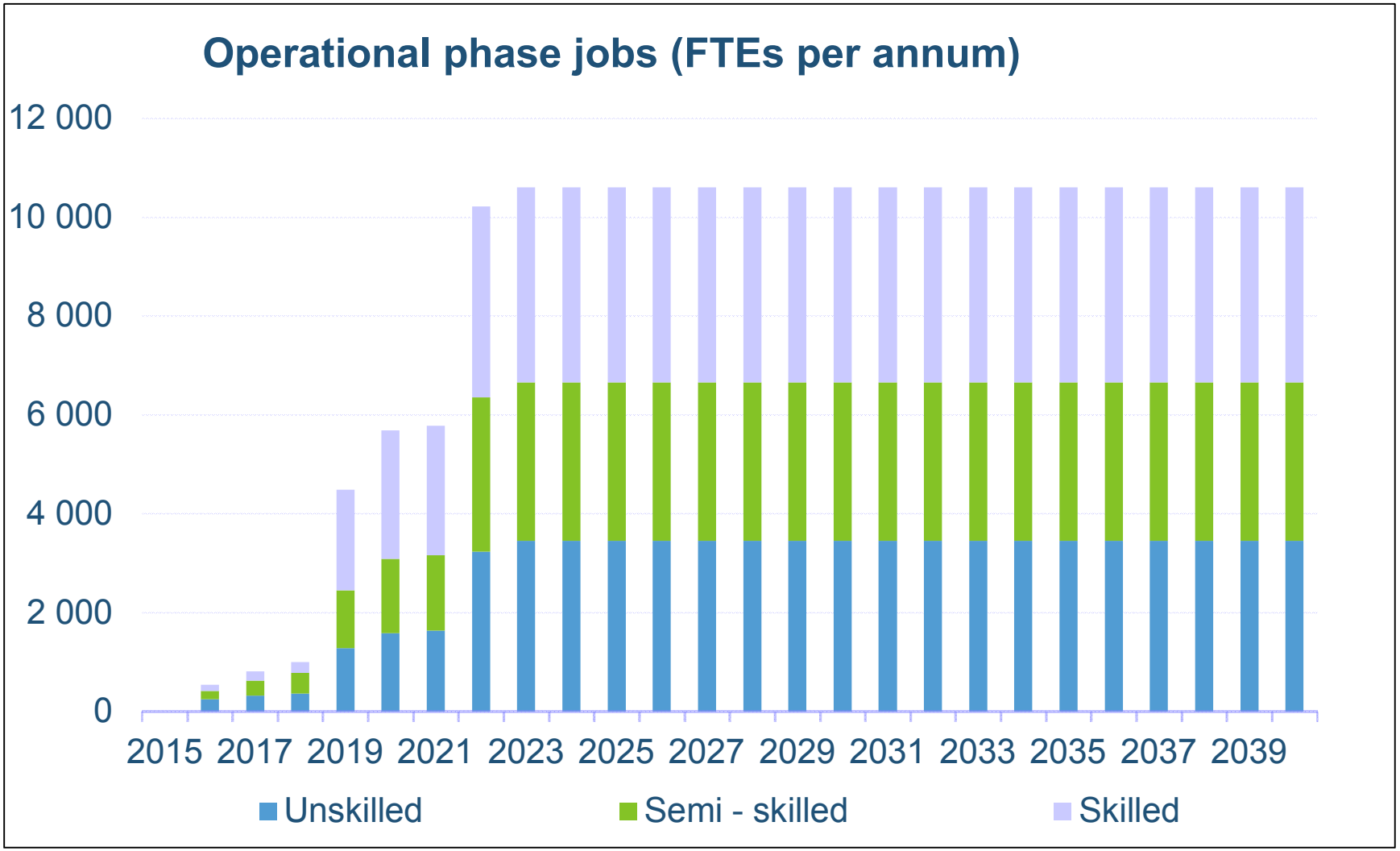
Current estimated timing & magnitude of project related capex



Construction phase jobs created



Direct operational jobs created



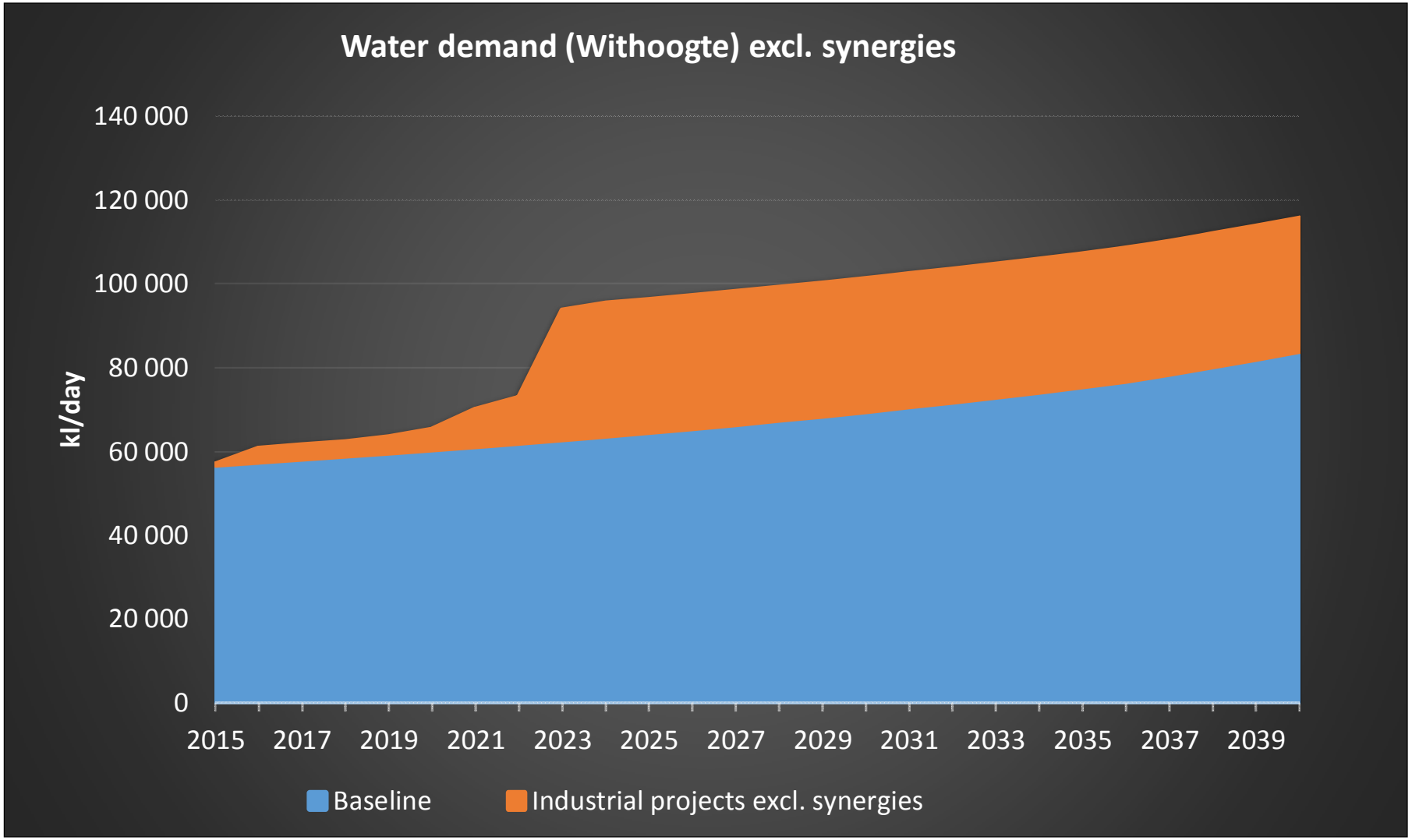
IMPACT ON SERVICE DEMAND AND INFRASTRUCTURE SUPPLY OPTIONS

Water System

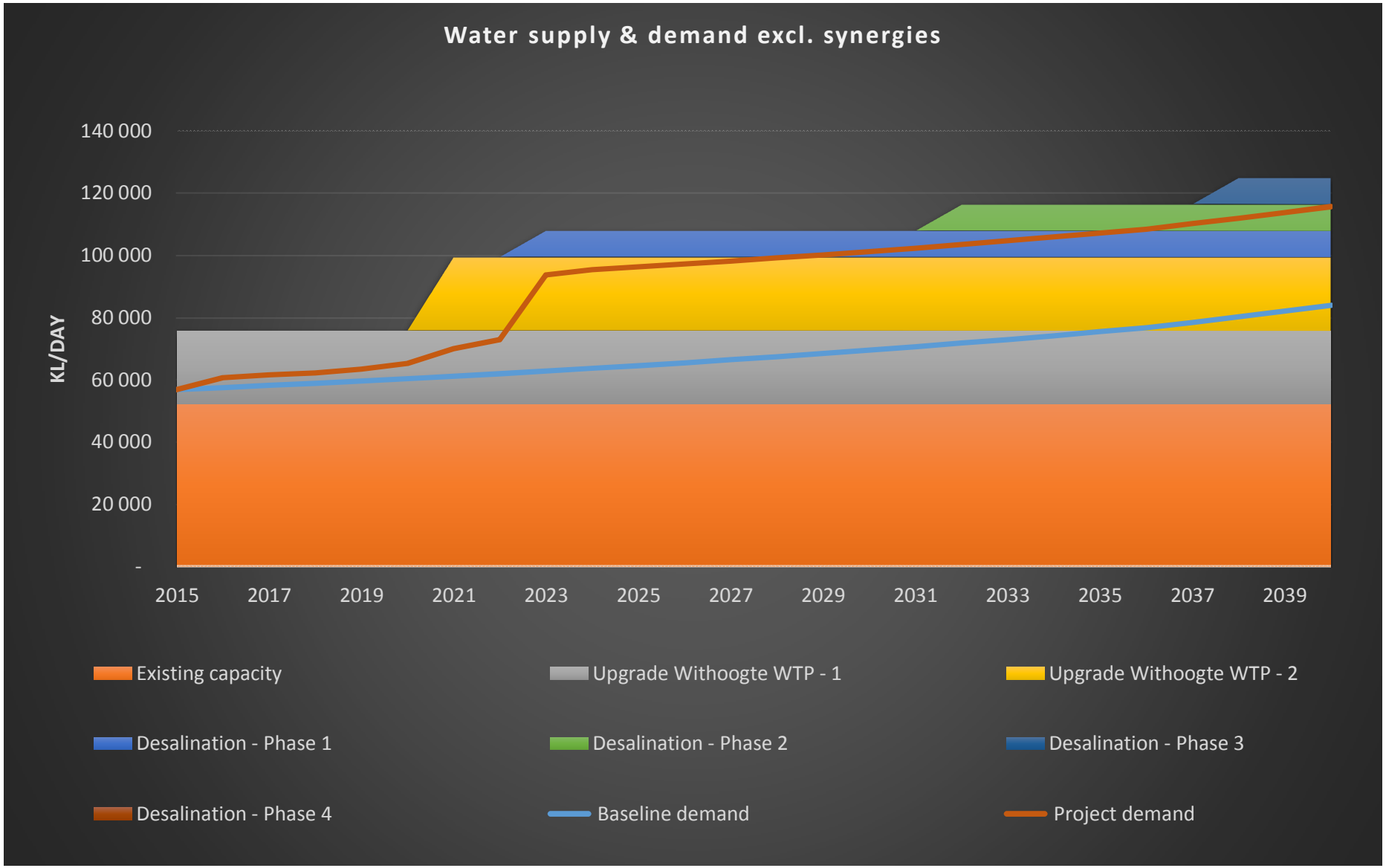
- Main raw water source = Misverstand Dam
- Demand from the Withoogte system, (which supplies SBM and parts of the surrounding municipalities) currently exceeds the supply allocation of 22 million m3/annum.
- Proposals include expansion of Withoogte, additional pipelines, demand management, increased allocation from Berg River, & desalination.
  - Desalination will impose extra costs on existing industry.

- AADD was originally expected to increase from 41 Ml/d in 2012 to **112 Ml/d in 2040 (project demand estimate of 116Ml/d, 109 Ml/day with synergies)**

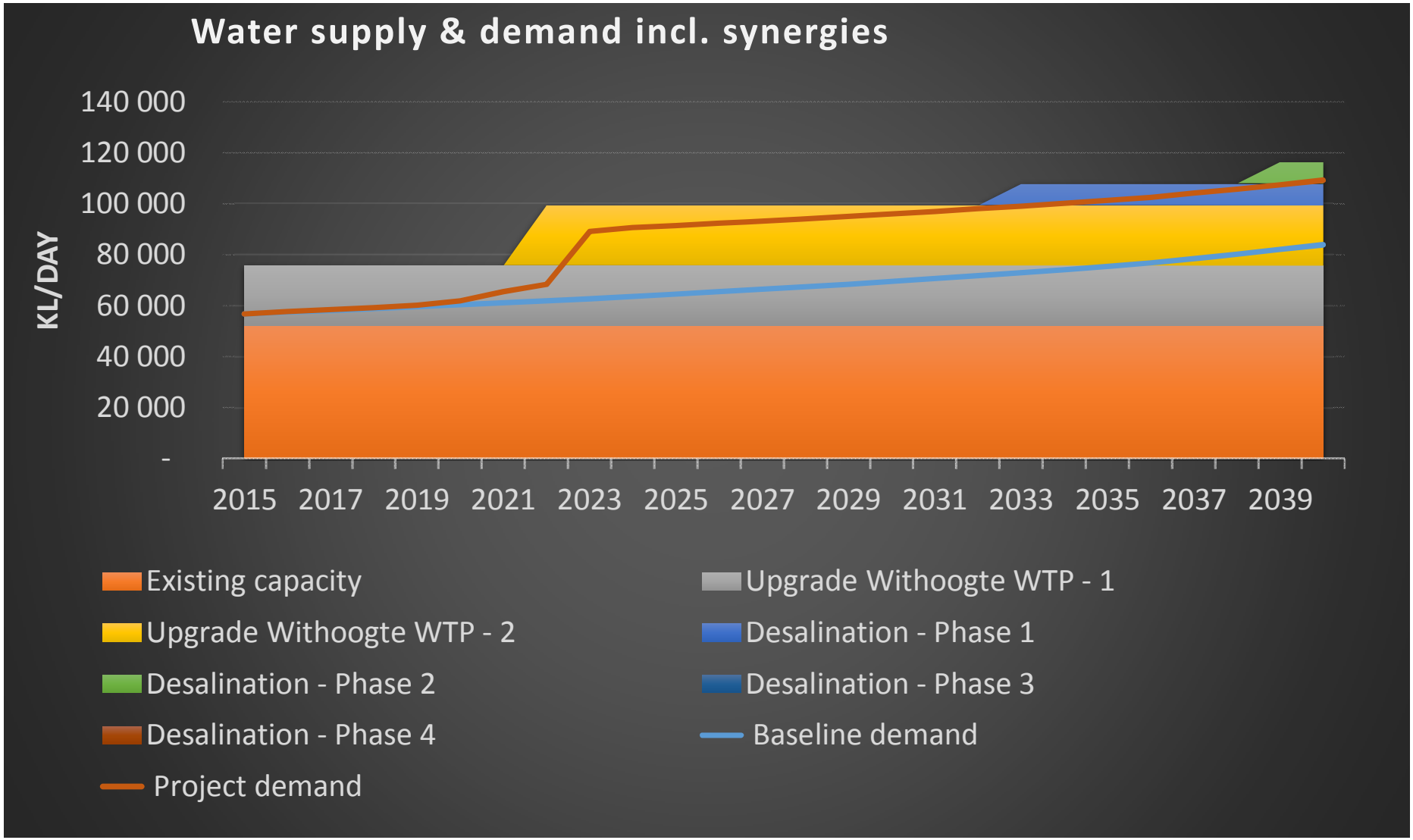
Estimated impact on total water demand



Impact on water demand & supply options



Water Supply options with synergies

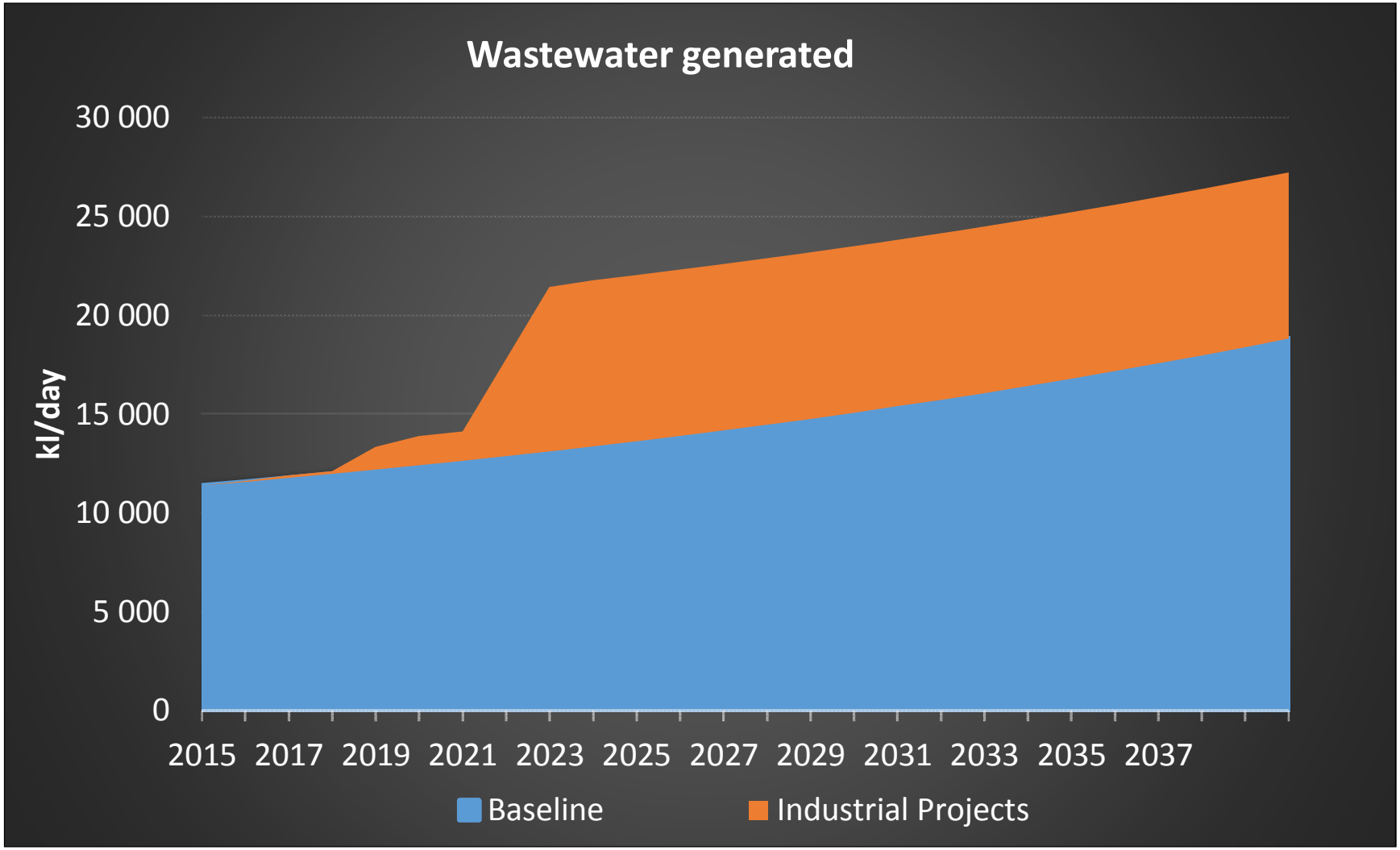


Sanitation & industrial effluent

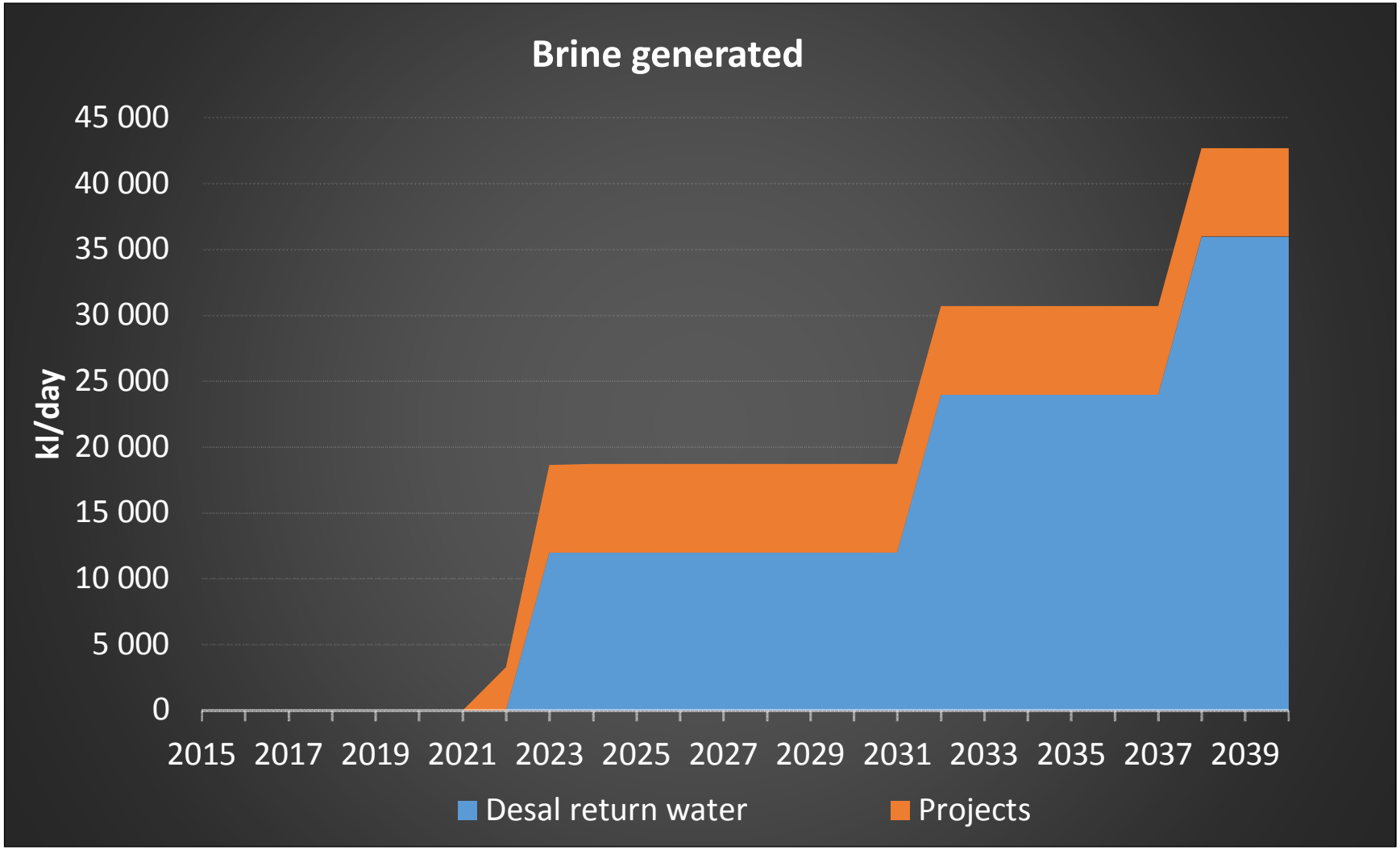
- Original predicted increase in wastewater volumes from 14 million m^3/a in 2010 to 17 million m^3/a in 2030.
  - **Current estimates of approx. 17 million in 2030, 20.5 by 2040**

- Upgrading of Langebaan WWTW constrained due to lack of space; upgrading required at the Saldanha and Vredenburg WWTWs,
  - Possibility of a centralised WWTW capable of handling industrial waste.
  - Options for re-use of effluent for supply to industry.
- Disposal of industrial effluent (esp. brine) a key issue
  - Possible synergy with proposed desalination plant (only one outfall allowed into sea)
  - Also on-site pre-treatment by industries

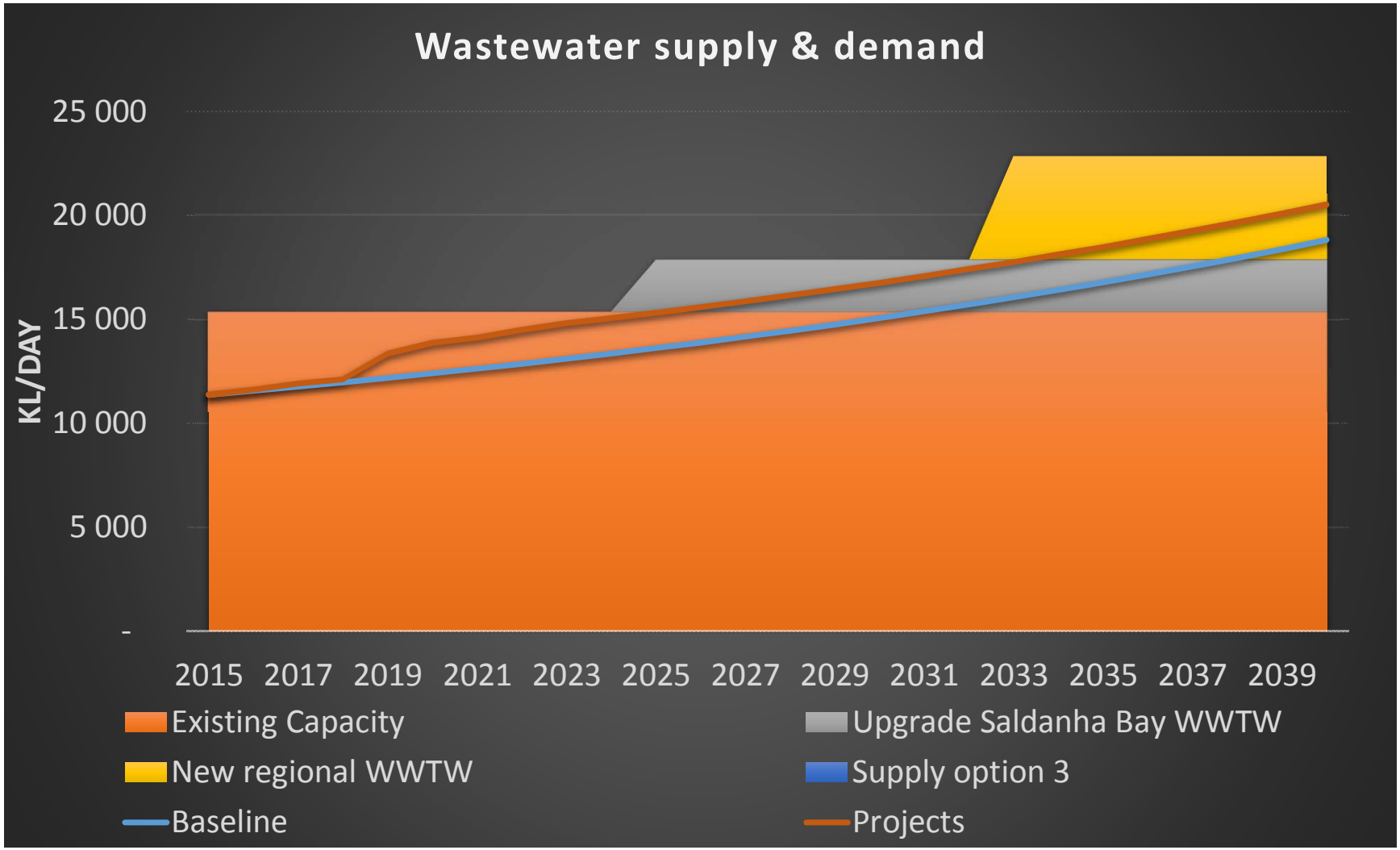
Total wastewater generated



Anticipated brine outfall volumes



Wastewater supply & demand



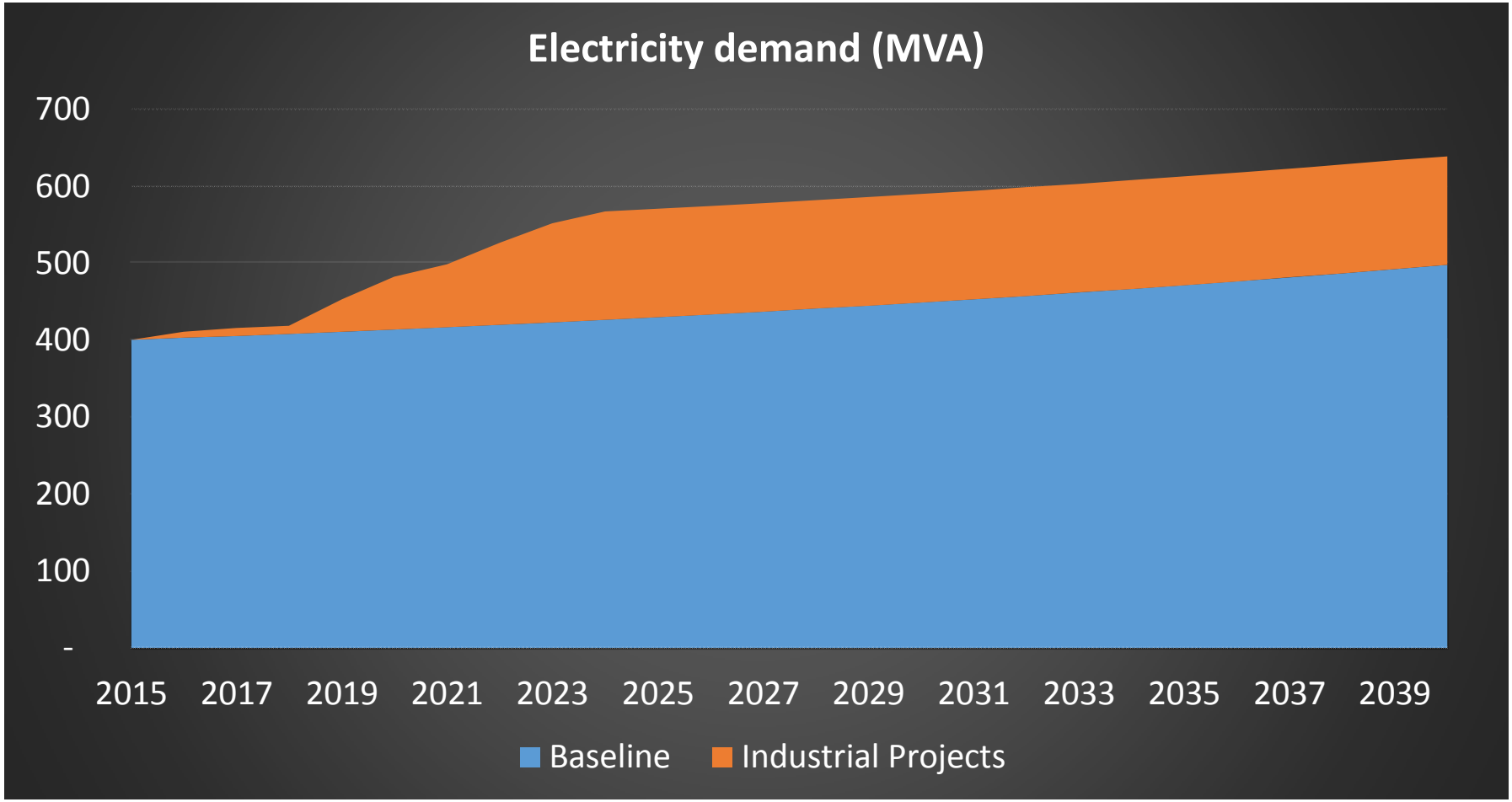
Electricity System

- **Infrastructure constraint is on the transmission lines & sub-stations, not a supply issue**
- Notified Maximum Demand (NMD) for electricity (from major towns) estimated at 55 MVA, maximum peaks of about 47 MVA.
- Current losses at around 12%
- Earlier estimates indicated that electricity supply would soon outstrip supply given current applications: currently lower due to global market conditions, fuel switching
- Current 66MVA available capacity at Blouwater allocated to the rare earth mineral beneficiation project

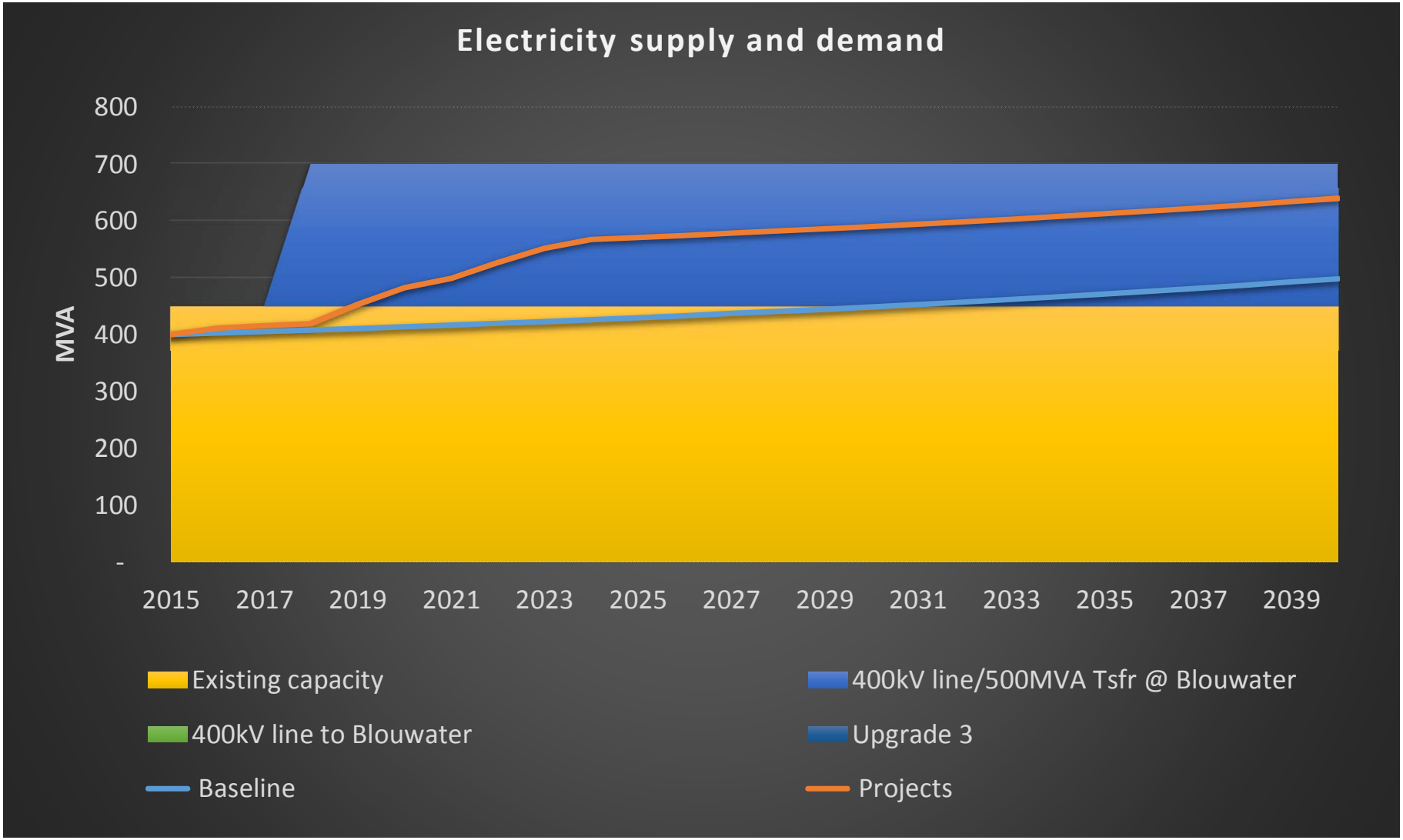
Current supply proposals include:

- Additional 132 kV transmission lines between Aurora Transmission Station and Blouwater Substation
- Extend 400 kV system from Aurora to Blouwater and upgrade the status of Blouwater Substation to a fully-fledged transmission station

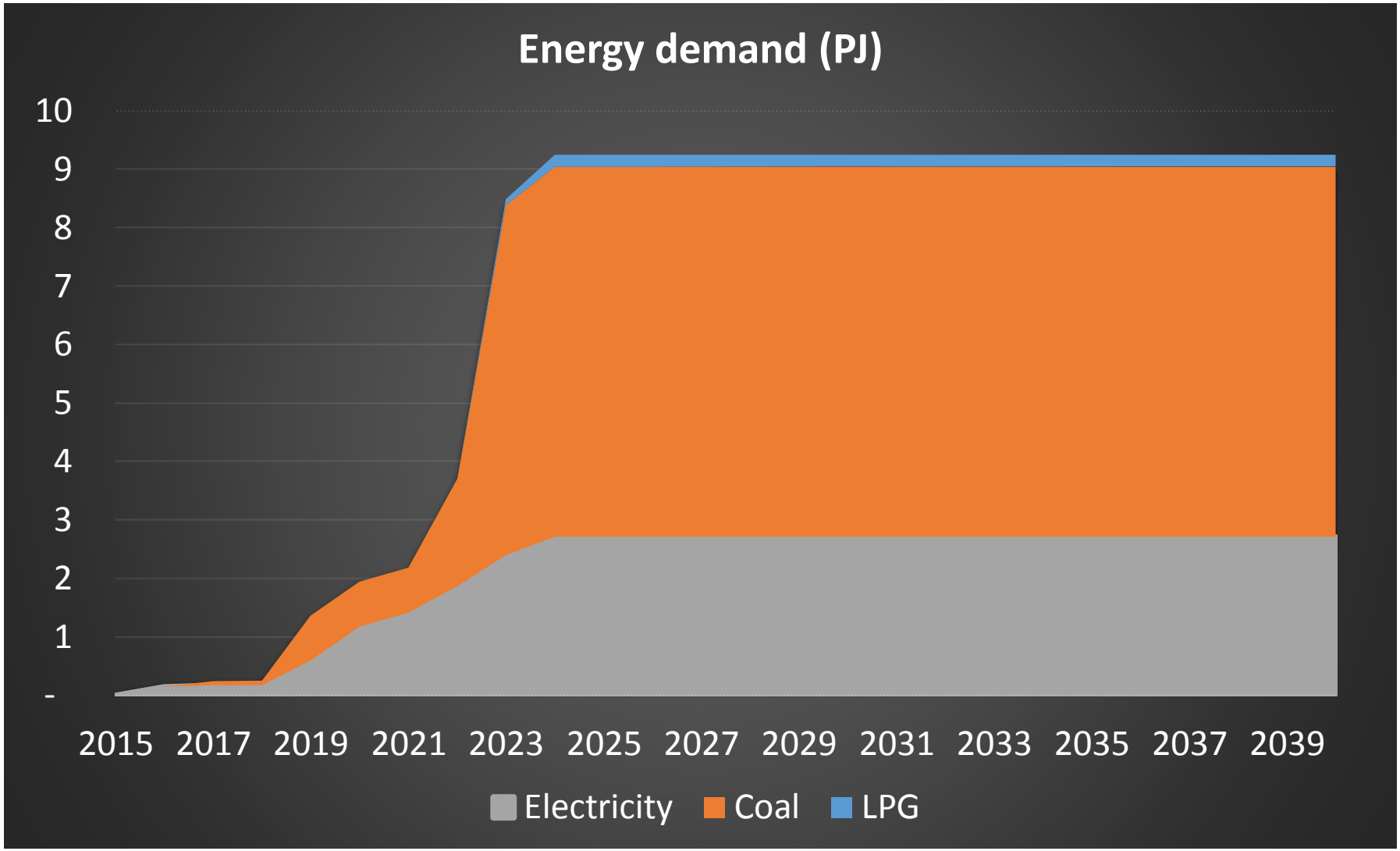
Electricity demand



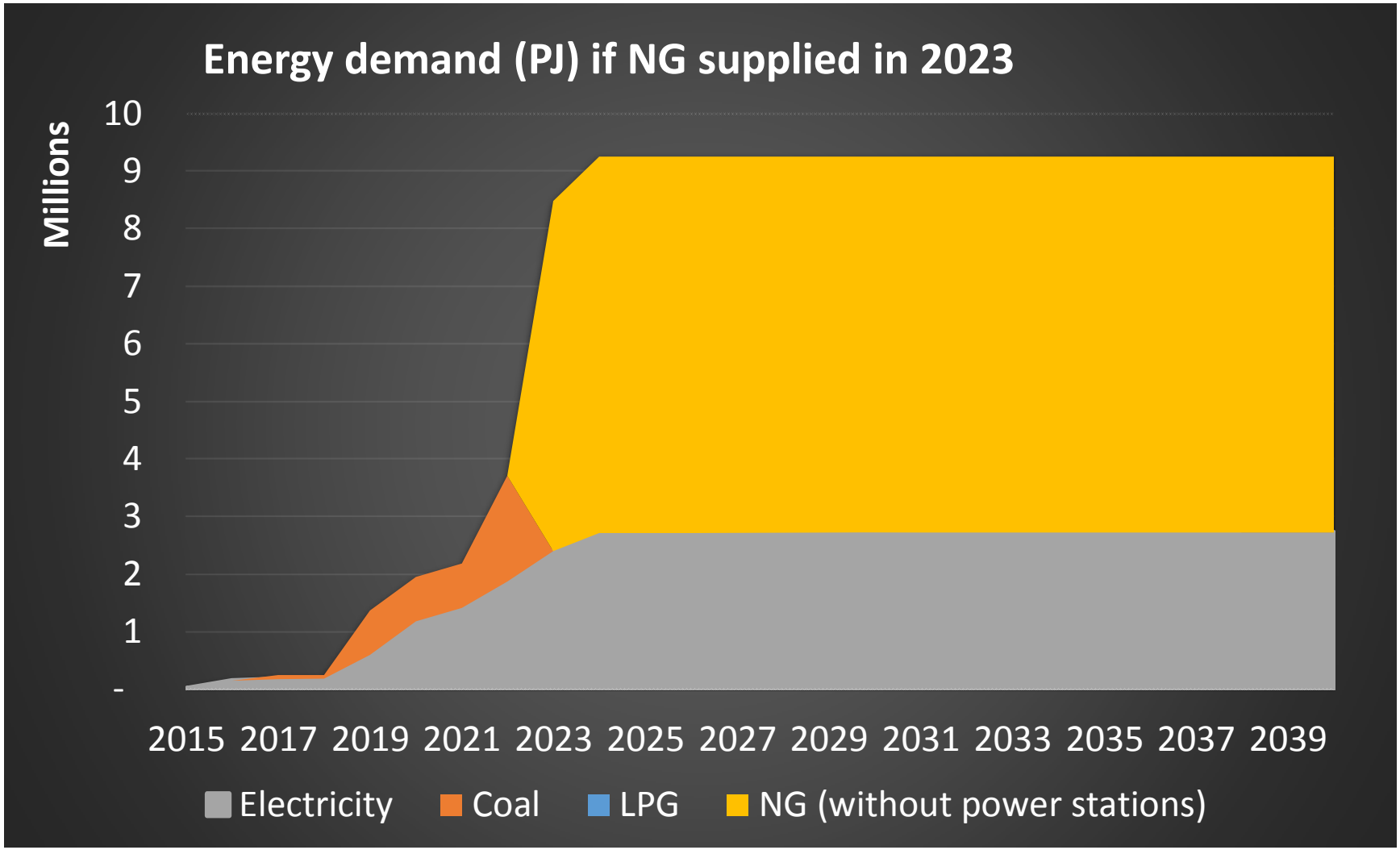
Electricity supply and demand



Energy demand by fuel type



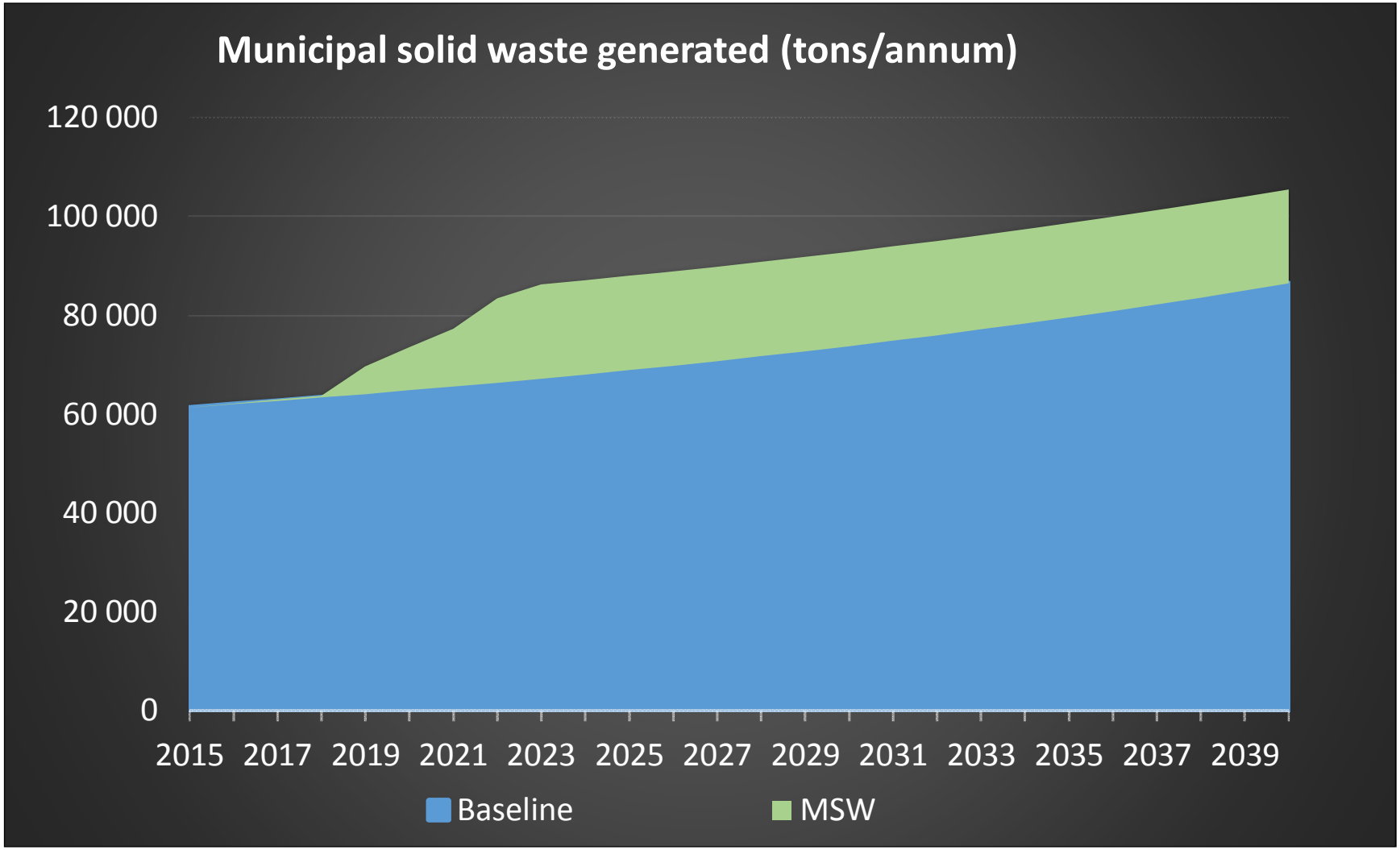
Energy demand with NG from 2023



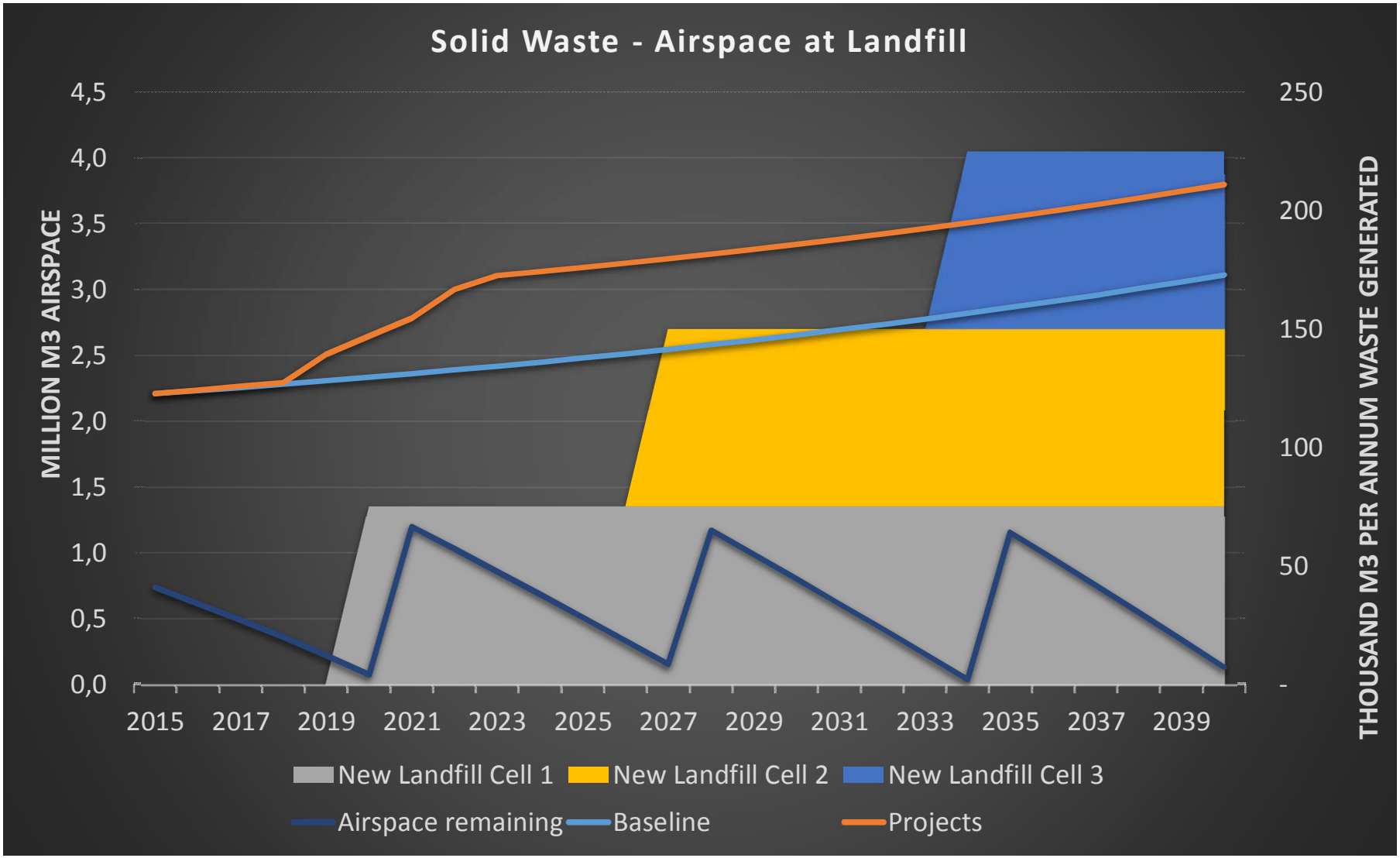
Current solid waste situation

- Need for a solid waste transfer station.
- Need to address hazardous waste – currently all transported to Vissershok in CoCT
- Vredenburg land expected to reach max capacity in 5 years.
  - Site may be upgraded and expanded to become a district landfill

Municipal Solid Waste generated

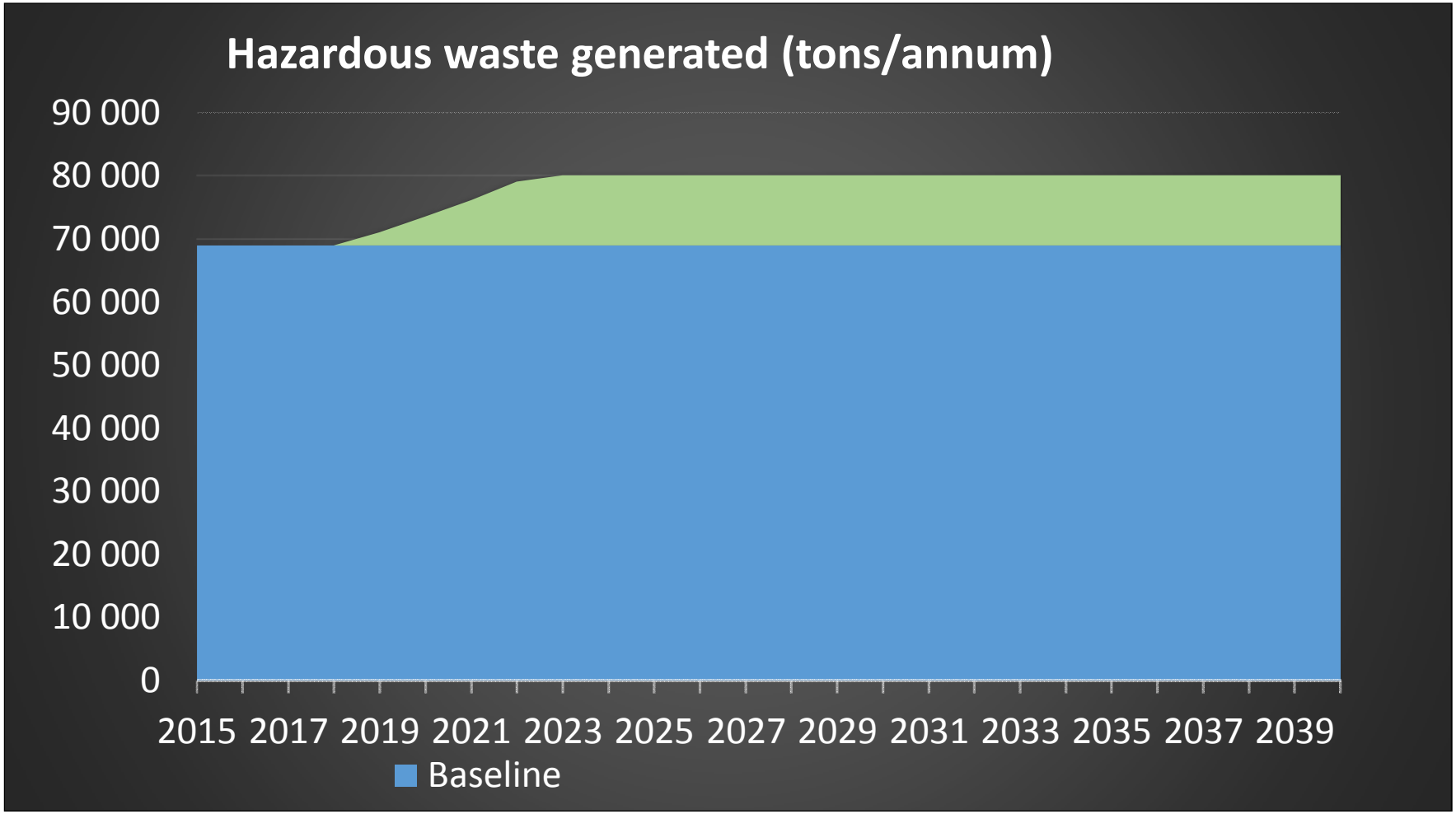


MSW – Airspace supply & demand



Hazardous waste generation

Relative to Vissershok volumes



Estimated cost of additional service infrastructure requirements

Projected service outputs			
Service	**Capital cost (R million)**	**Additional demand (2040)**	**Units**
Water	2,620	115,625	kl/day
Wastewater	148	20,518	kl/day
Electricity	963	639	MVA
Solid waste	48	105,476	Tons / annum
Port In	-	1,349,202	Tons / annum
Port Out	-	4,085,571	Tons / annum
Rail in from the North	-	2,674,386	Tons / annum

Current land transport context

- Road networks identified as significant barrier to expansion of industrial corridor linking eastern Saldanha with Port and Port with SW Vredenburg. (meant to be addressed by Operation Phakisa)
- Rail: Current plans to upgrade existing Transnet freight line
  - Even without the predicted investments, the Cape Town-Saldanha connection can cope with the moderate traffic expected to 2040.
  - Despite good technical condition, Sishen-Saldanha line will be at system failure (defined as demand of over 130% of capacity) by 2042 with no additional investments.

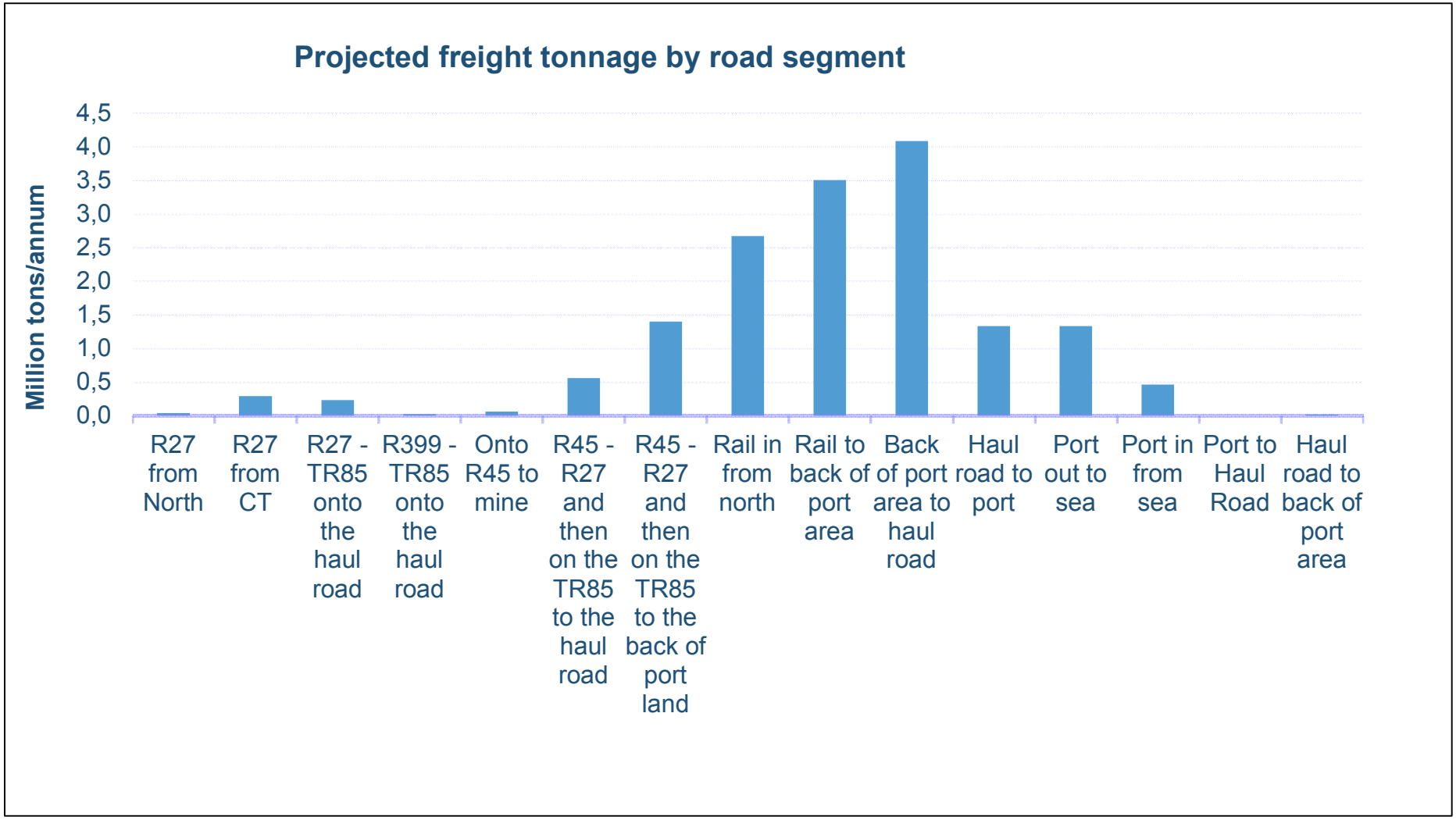
Freight Transport Demand: Road, rail, port

Methodology

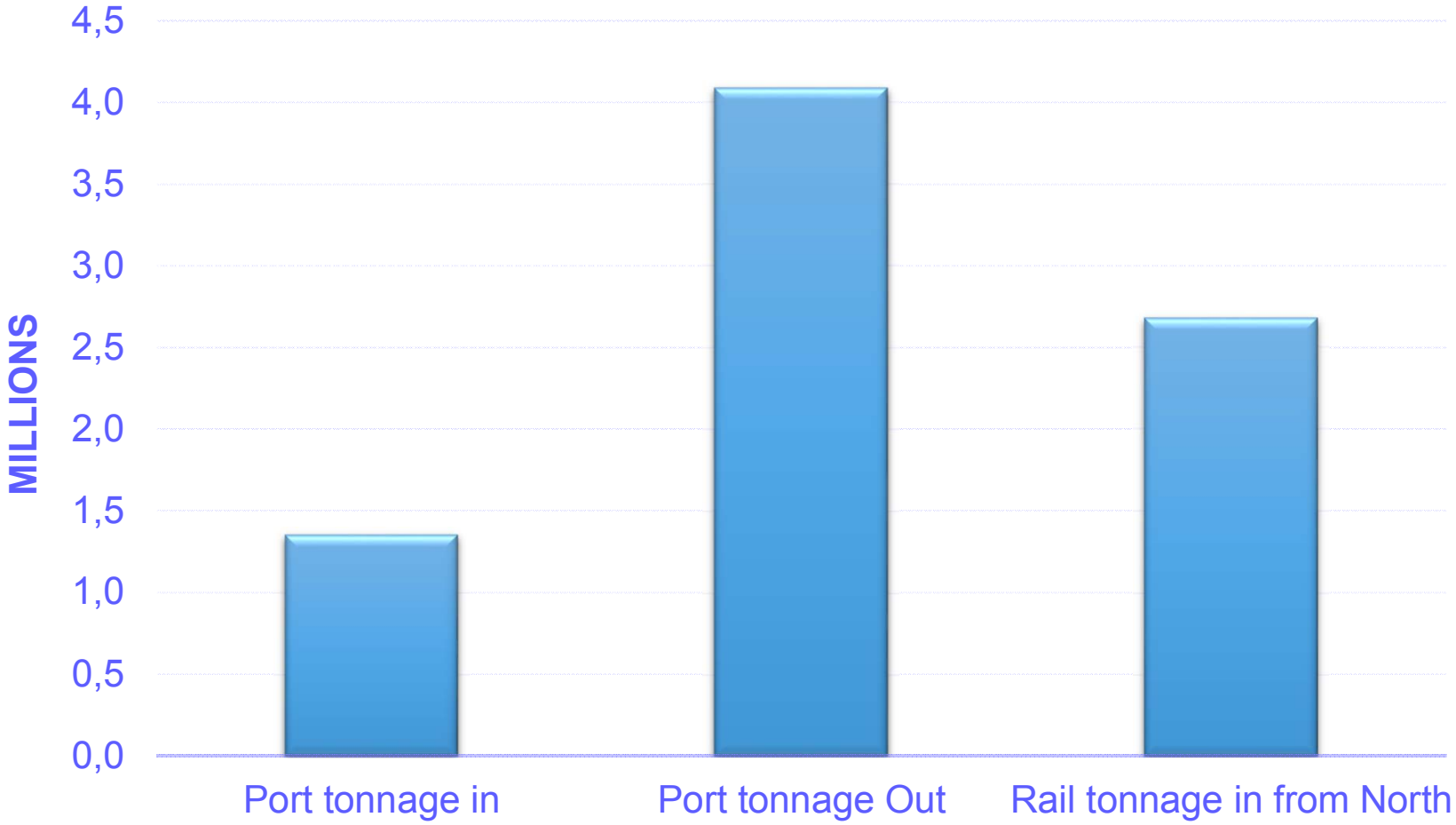
- Allocation of reported tonnages of key inputs and products in and out of Saldanha
- Mapping of tonnages by mode and road segment
- Used maximum tonnages achieved annually due to the industrial projects

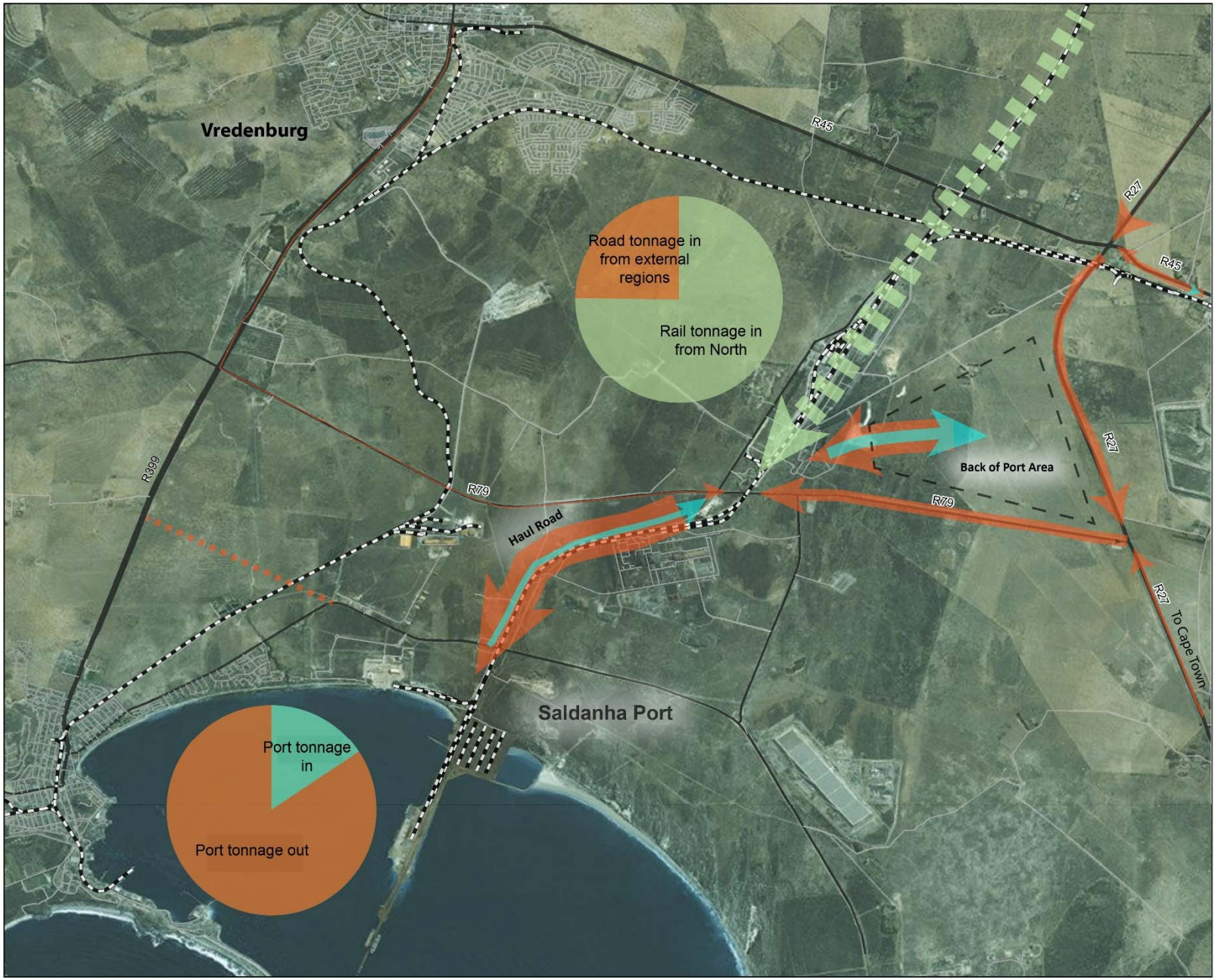
- No assessment of workplace demand/passenger transport or traffic assessments

Projected road freight tonnages


Projected freight tonnage by road segment
Million tons/annum
4,5
4,0
3,5
3,0
2,5
2,0
1,5
1,0
0,5
0,0
R27 from North
R27 from CT
R27 - TR85 onto the haul road
R399 - TR85 onto the haul road
Onto R45 to mine
R45 - R27 and then on the TR85 to the haul road
R45 - R27 and then on the TR85 to the back of port land
Rail in from north
Rail to back of port area
Back of port area to haul road
Haul road to port
Port out to sea
Port in from sea
Port to Haul Road
Haul road to back of port area

Annual freight volumes by rail and sea





Legend

Rail

Roads

Other

Freeway

Secondary

Residential

Projected Demand

= 500 000 TPA Roads Export

= 500 000 TPA Roads Import

= 500 000 TPA Rail

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Transport Demand

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N

1:50 000

0 0.30.6 1.2 1.8

Km's

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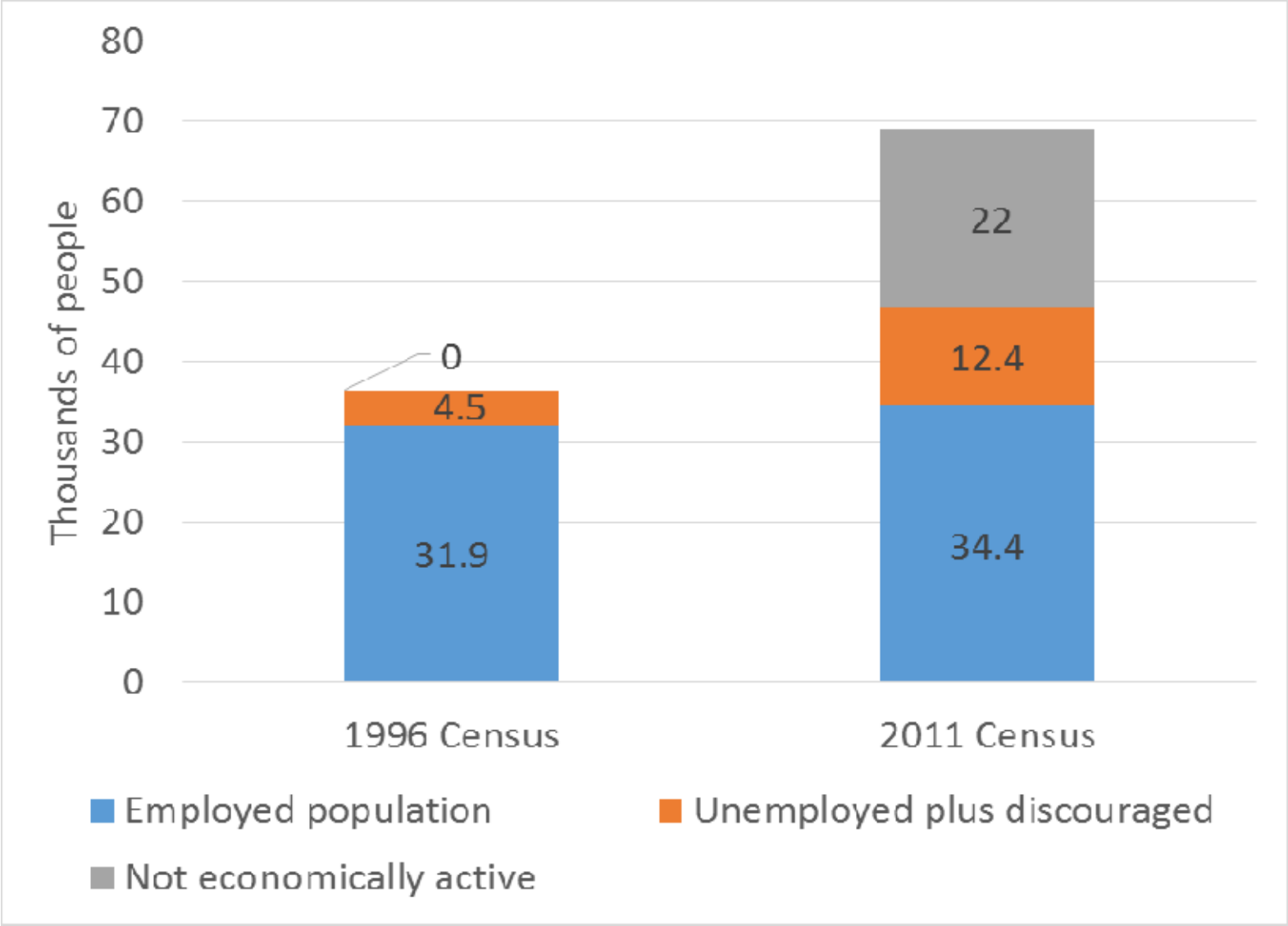
JOBS ANALYSIS

Working age profile between 1996 and 2011 Census

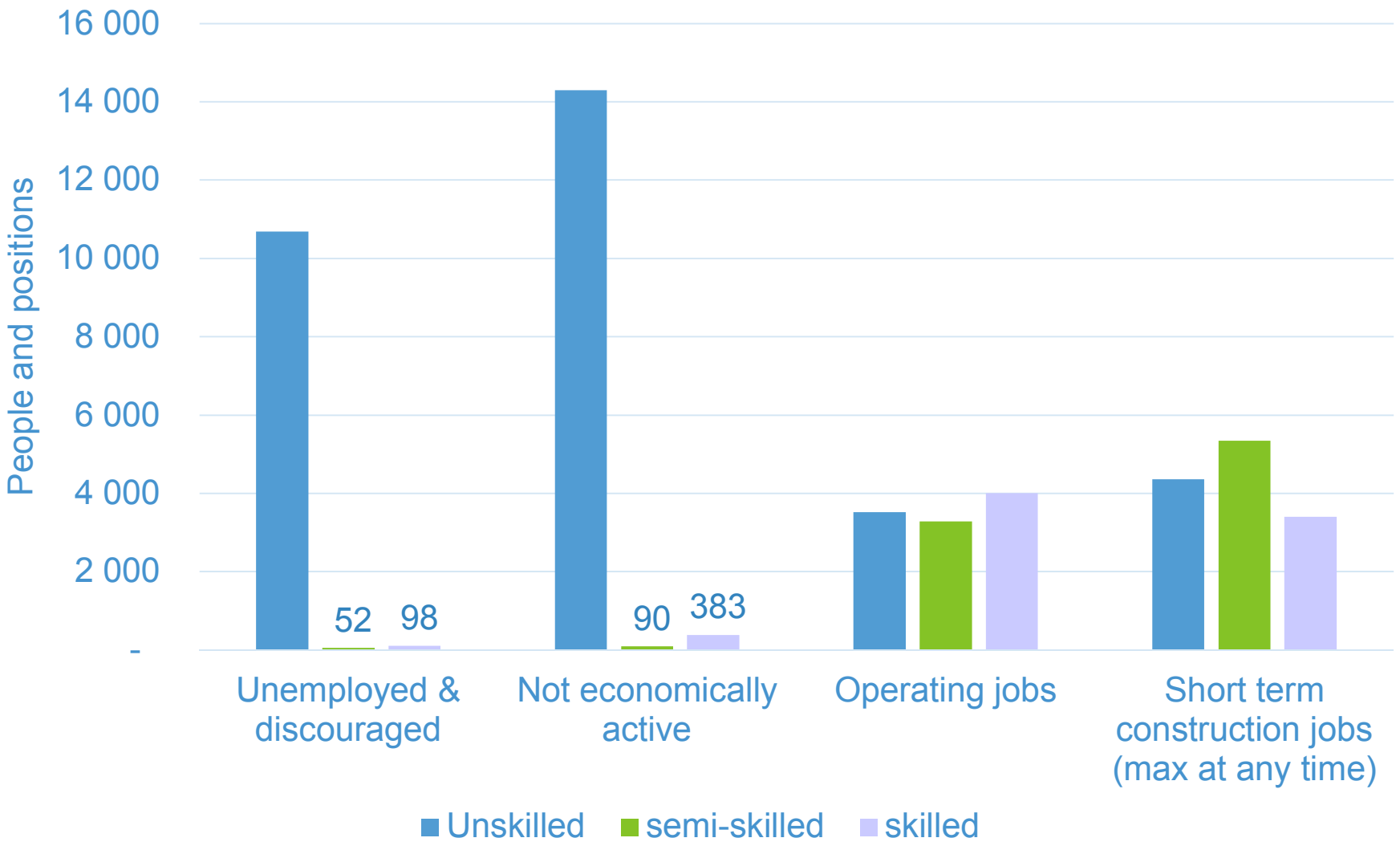
Population aged 16 to 65



Matching of direct job opportunities to the educational level of the unemployed

- Used Census 2011 data to obtain a profile of the working age population, by employment status, and highest level of education attained.
- Matching of skill level to educational level:
  - Skilled: Post school degree or diploma
  - Semi-skilled: some post matric or school training, but not degree
  - Unskilled: Matric and lower

Matching of potential direct jobs to unemployed skills base



DEMAND FOR SOCIAL FACILITIES BY 2040

High level Social Facilities analysis

Methodology

- Demographic analysis
  - Based on direct job creation, assuming 1 family per new position
  - PWC population projections for Saldanha LM
- CSIR *Guidelines for the Provision of Social Facilities:*
  - Population and distance thresholds
  - Used standards relevant to each town based on their current (and future) population size: ‘Small towns/isolated regional service centres’ and ‘Villages

Legend

- Schools 5 km Service Area
- Clinics 5 km Service Area
- Library 10 Km Service Area
- Rail
- Arterial Road
- Freeway

Settlement Population (Households)

- 1-500
- 501 - 1000
- 1000 - 1500
- 1501 - 2000
- 2001 - 2500
- 2501 - 3000
- 3001 - 3500
- 3501 - 4000
- 4001 - 4500
- 4501 - 5000

West Coast Industrial Plan

Social Facilities Coverage

November 2015

N

1:200 000

0 1 2 4 6

Km's

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Assumed population growth to 2022

Based on PWC projections and direct job creation

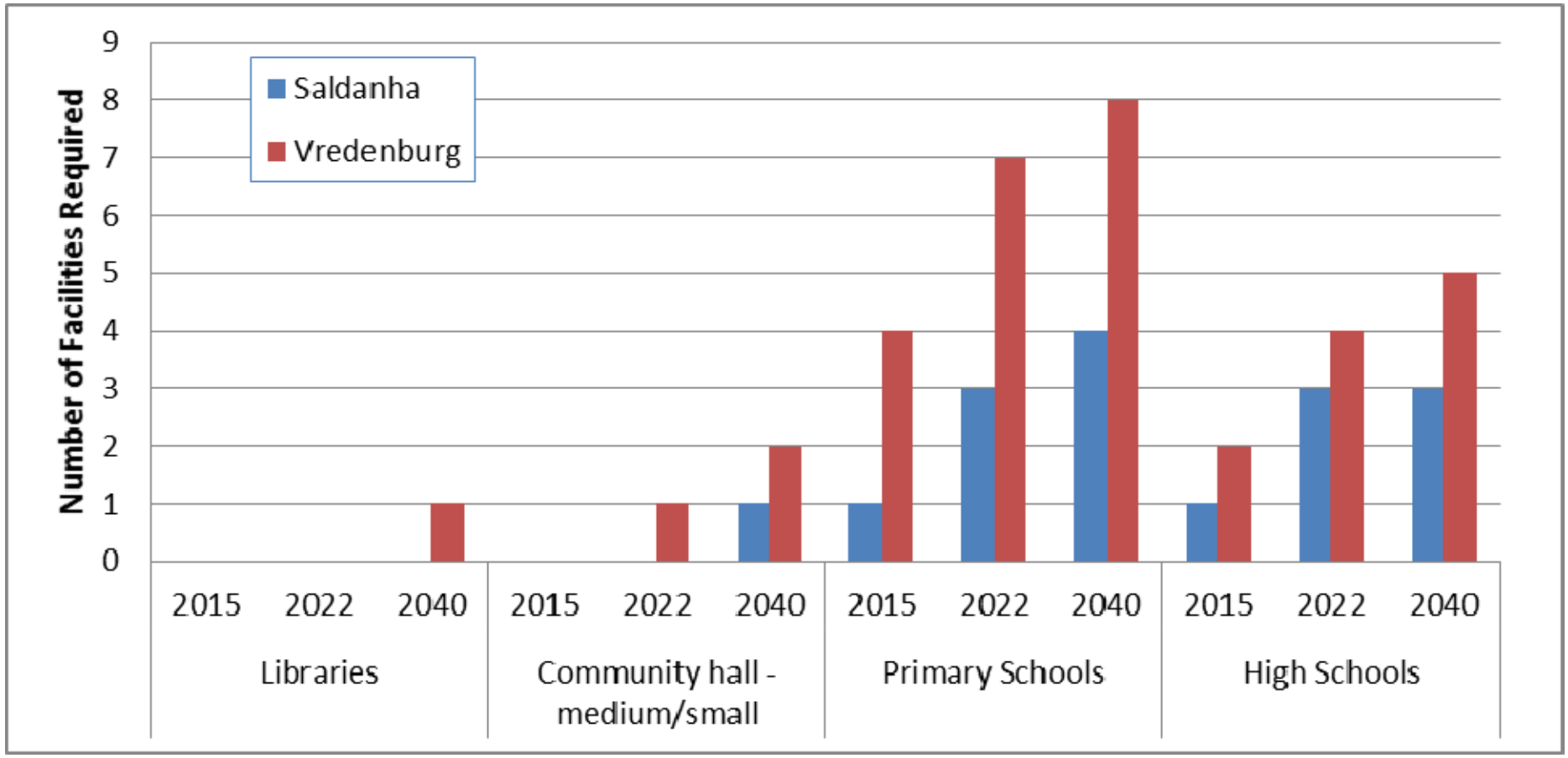
Settlement	Growth Rate per annum (2015 - 2022)	Percentage distribution of municipal population growth per annum
Saldanha	4,4%	37%
Vredenburg	4,4%	50%
St Helena	1,7%	1,1%
Hopefield	1,7%	0,7%
Langebaan	4,4%	11%
Paternoster	1,7%	0,2%
Total	**3,45%**	**100%**

Demand for Social facilities

Deficit or surplus based on population

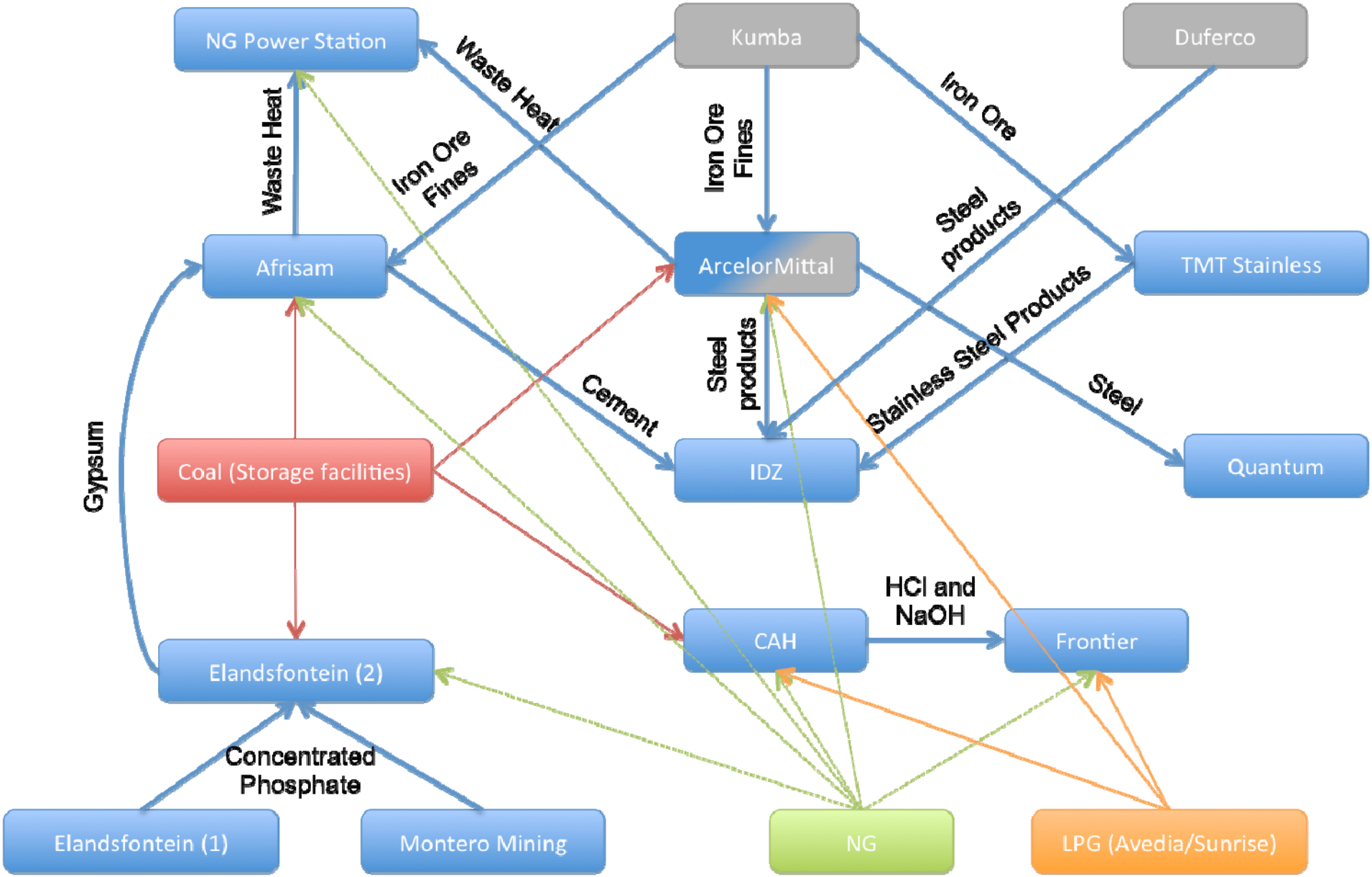
Facility Type	Current		By 2022 (after development of full project list)	
	Saldanha Deficit/ Surplus	Vredenburg Deficit/ Surplus	Saldanha in 2022	Vredenburg in 2022
Libraries	1	1	1	0
Public Assembly (Community hall - medium/small	2	1	0	-1
Sports (Grassed Surface)	3	3	1	2
Cemeteries	1	5	1	4
Police	0	1	0	1
Clinics	1	2	0	0
Primary Schools	-1	-4	-3	-7
High Schools	-1	-2	-3	-4

Social facilities required to 2040



ADDITIONAL SYNERGIES

Energy and material synergies and co-operation opportunities



PROJECT ASSESSMENT RELATIVE TO THE VISION FOR 2040

Suggested assessment framework (1)

Projects to be evaluated against the 2040 Vision on a qualitative basis			
Yes	Maybe	Neutral	No
2040 Vision for Saldanha		**Guiding question**	
Thriving, industrial node providing products to both the national and international market		Is there likely to be a market for the product in 2040?	
Locally based ancillary services, which are servicing minerals and manufacturing base		Does the project have servicing needs which can be met through local suppliers?	
A thriving provincial and national economy		Does the project contribute to increased potential for provincial/national value-add eg. beneficiation at source, eg. Sishen, or are there other potential broader economic spinoffs?	
An internationally recognised oil & gas services sector hub		Does the project contribute to the oil & gas services sector/industrial hub vision?	
Reduced flows of raw minerals exiting through the port compared to 2015, with a higher proportion of intermediate or final products		Does the project provide or support local beneficiation opportunities?	
Locally available LNG has enabled firms to stop using coal as a fuel source, resulting in improved air quality.		Can the project make use of LNG, when available or does the project facilitate the increased local availability of LNG?	
Electricity in the Western Cape is abundant, affordable, and results in 50% lower scope 2 GHG emissions relative to 2015.		Does the project contribute to increased availability of clean, low carbon electricity?	

Suggested assessment framework (2)

Projects to be evaluated against the 2040 Vision on a qualitative basis			
Yes	**Maybe**	**Neutral**	**No**
2040 Vision for Saldanha		**Guiding question**	
Sustainable, high value aquaculture is present both in and around the Bay, and is managed in coordination with port-activities.		Is the project likely to complement aquaculture in in that it does not jeopardise water quality and utilization potential within the Bay?	
The local economy is robust, and diversified.		Does the project offer a new service or product which has not previously been offered in the area?	
Local air quality is better than in 2015		The project results in improved local air quality	
The permanent community has grown to be able to meet the needs of the local economic base, with only limited needs for skills to be brought in from Cape Town.		Can the bulk of the labour needs of the project be met locally?	
Unemployment is significantly reduced, with jobs which are suited to the locally availability of skills		Can the project reduce local unemployment among the unskilled work-force?	
There is enough affordable, clean water for all, and water use is optimised between with re-use and recycling of different water streams		Does the project use water efficiently?	
There is a supportive and coordinated regulatory environment		Is the current regulatory risk of the project minimal?	
There is a thriving leisure and tourism sector		Does the project have a positive impact on the tourism and leisure sector?	

THANK YOU